



Department of Energy

Pittsburgh Naval Reactors Office
Idaho Branch Office
P.O. Box 2469
Idaho Falls, Idaho 83403-2469

NR:IBO-02/029

February 14, 2002


Kathleen E. Hain, Director
Environmental Restoration Program
Idaho Operations Office, USDOE

SUBJECT: NAVAL REACTORS' SUMMARY COMMENTS

The Naval Reactors' Program received a copy of the draft report, "Postulated Naval Reactors Program Radionuclide Inventories Sent to the Subsurface Disposal Area from 1952 Through 1993" on January 7, 2002, and a draft Remedial Investigation/Facility Study (RI/FS) which relies heavily on the radionuclide inventory speculated in the subject draft report, on February 4, 2002. Both of these documents are complex and substantive in size. As our comments have been requested by February 14, 2002, comments are limited to those pertaining to our projected inventory of waste disposal at the RWMC.

In summary, these draft documents contain numerous errors that greatly overestimate the NRF cumulative fission product waste curie content. The assumptions and analytical methodology cannot be supported and, as such, we can not concur on either of these reports without substantive changes. NR summary comments on information related to our source term are provided in the attachment. More detailed comments will be provided separately during the week of February 18, 2002.

As offered in the past, we would prefer to work with you and your staff early in the development of documents affecting our programs. We look forward to understanding how DOE-ID will incorporate the revised NRF source term information into the draft RI/FS.


T. M. Bradley, Manager
Naval Reactors Idaho Branch Office

Attachment:
As stated

cc: W. E. Bergholz, DOE-ID
J. L. Lyle, DOE-ID
K. J. Holdren, BBWI

Summary Comments Regarding Projected Inventory
of NR Waste Disposed at the RWMC

Shippingport Blanket Fuel:

The contractor calculated the NRF fission product disposal source term to be 200,000 curies of Cs-137 plus other associated fission products and transuranic nuclides. About 58 percent of this was from Shippingport natural uranium blanket fuel. As noted in previous correspondence, disposal records have been found for small quantities of Shippingport Core-1 blanket fuel. The contractor researched unclassified technical reports from the Bettis Atomic Power Laboratory which indicated that approximately 4500 kilograms of Shippingport blanket fuel were shipped to NRF for examination. The contractor assumed that since waste disposal records were found for some of this fuel, NRF must have disposed of all of this fuel that is not still in storage at NRF. The missing uranium amounted to about 2900 kilograms. NRF searched their records and found large shipments of Shippingport blanket fuel to Hanford in 1966. A Hanford report documents that this fuel was processed there. Thus, there is good evidence that the amount of buried Shippingport blanket fuel is about 225 kilograms, or a factor of 13 less than the contractor calculated. Additional details and documentation concerning Shippingport fuel will be provided separately.

S1W and USS NAUTILUS Spent Fuel:

The contractor's report includes late 1950 records showing heavily shielded fission product waste being sent to RWMC for burial. The contractor concluded that this waste had to have come from early spent cores that were examined at NRF. For the initial S1W and NAUTILUS cores, the contractor calculated the total uranium content from unclassified sources. The calculated uranium content was greater than the uranium recovered from these cores at the processing plant, so the contractor concluded that the missing uranium had to have been buried as core examination waste. The Cs-137 from this source accounted for about 36 percent of the overall 200,000 curie Cs-137 total for NRF. From classified design and examination information, we know that the uranium content of the S1W and NAUTILUS cores was actually much lower than the contractor calculated. Thus, even using the contractor's "missing difference" methodology, the maximum amount of buried fission products was at least a factor of 6 lower than the contractor calculated. Additional details will be provided separately.

Fuel Test Specimens:

The contractor calculated a test specimen source term based on unclassified ATR safety documentation. He assumed that all pre-1970 test specimens were disposed of at RWMC rather than recovered at the processing plant. For Cs-137, the test specimen source term accounted for about 6 percent of the NRF total. Based on the known amount of irradiated fuel test specimens accumulated at NRF since 1970, the contractor's estimate for the pre-1970 test specimen source term appears reasonable assuming that pre-1970 test specimens were shipped for burial.

Activation Products:

The contractor's report also attempted to independently calculate the activation product source term, which is dominated by non-fuel structural material cut off from naval spent fuel modules at NRF. The report concludes that his independent estimates of the activation product total agreed reasonably well with the most recent NRF calculated total.

Overall NRF Waste Source Term:

The net result of the Shippingport and core examination corrections is that the contractor's estimate of 200,000 curies of Cs-137 goes down to about 30,000 curies. As indicated above, the activation product source term is consistent with data previously provided by NRF. An overall summary of the NRF curie content will be provided separately. This will include a revised fission product and actinide source term as well as the activation product source term from my previous correspondence.

Other Apparent Errors in RI/FS Source Terms:

Our brief review of the draft RI/FS indicates that there are radionuclide source terms from other INEEL facilities which are likely erroneous. For Cs-137, the NRF share of the overall RWMC Cs-137 source term is slightly over 20 percent. For some of the other fission product and actinide nuclides, the NRF percentage of the total is much higher. For the long lived fission product I-129, NRF accounts for 96 percent of the source term. For Pu-238, NRF accounts for 85 percent of the total. There doesn't seem to be a technical basis for such differences to exist.

In the draft report on the NRF source term, the contractor calculated all of the fission product and actinide radionuclides that would be present in irradiated uranium postulated to have been disposed of by NRF. It doesn't appear that similar calculations were made for other large fission product sources at RWMC. Other big Cs-137 waste streams which didn't come with the full range of other fission product and actinide radionuclides included TRA "metal" (316,000 curies Cs-137), ANL "subassembly hardware" (400,000 curies Cs-137), TRA "scrap metal" (183,000 curies Cs-137), and TRA "core and loop components" (89,000 curies Cs-137). It is unclear how such very large amounts of Cs-137 could be present in such metallic waste streams without having irradiated uranium present. Separated fission product waste could have large amounts of Cs-137, but the waste descriptions do not seem to describe separated fission product waste streams.

Evaluation of these apparent discrepancies is needed since even the corrected NRF fission product and actinide source term might inappropriately remain the dominant RWMC source term for nuclides such as I-129 and Pu-238. Additional Comments on the draft RI/FS will be provided separately.